

Andrews (J. A.)

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CONTAGIOUS EYE-DISEASE.*

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THE diseases of the eye which must be considered contagious are the blennorrhoeic and diphtheritic. Von Graefe maintained that every abnormal discharge from the eye was contagious; and, within certain limitations, this is certainly true. The important question to decide is what is simple catarrh, for there are unquestionably cases of apparently simple catarrh of the eyelids in one individual, the discharge from which is capable of setting up an inflammation in the eye of another person when brought in contact with it. But, inasmuch as this simple catarrh does not, as a rule, endanger the sight of the individual, I shall not here ask to engage your attention with it, although I feel sure that, if it were generally believed that every abnormal discharge from the eye was contagious, it would establish a vigilance among patients, especially among that class on whom the great burden of blindness from these generally preventable causes falls, and bring them to the care of medical aid often in the very incipiency of their eye disorder; for such people, ignorant of the terrible consequences of not attending at once to these troubles, delay in

* Read before the New York County Medical Society, February 15, 1886.

applying for medical advice in these matters until the disease has made such terrible havoc with those parts of the eye, the integrity of which is indispensable to sight, that, when they do apply for treatment, their case is often helpless so far as restoration of sight is concerned. Too much can not be said in behalf of the need of making these facts known to every layman.

Blennorrhœa of the conjunctiva declares itself either in an acute or chronic form. Gonorrhœal and purulent conjunctivitis of the new-born have been classed under the head of acute conjunctival blennorrhœa. I have given many facts, in a recent communication, on the subject of the present paper, to show that these conditions are most probably identical.

The so-called granular conjunctivitis and papillary conjunctivitis are regarded as chronic conjunctival blennorrhœa. In a paper* which I had the privilege of reading before this society two years ago, I presented at some length the results of my histological studies of a number of cases of granular conjunctivitis examined at different periods of the disease, and by which I aimed to show that the great confusion which prevailed among investigators of this question as to the true nature of granular conjunctivitis was due to the fact that different observers had had different stages of the disease before them, and so some spoke of a *follicular form*, others of a *granular form*, and still others of a *papillary form*, while, in fact, these are different varieties of the same disease. I shall not again ask you to follow me through the tedious analysis of this question. I will only briefly refer to certain facts—*i. e.*, that, under the general name, trachoma, certain processes are embraced which authors agree depend on a chronic inflammation of the conjunctiva palpebrarum, combined with hypertrophic

* "Archives of Medicine," January, 1884.

conditions, and this process may spread not alone over the entire conjunctival tissue, but pass to the deep structures of the lids and even spread to the cornea.

The so-called granular form is characterized by the presence of sago-like bodies, sharply defined—often, as the disease advances, coalescing—seated in a chronically inflamed conjunctiva. For this reason the disease is called granular conjunctivitis. It is also known as trachoma, *ophthalmie égyptienne*, *ophthalmie militaire*, and follicular conjunctivitis. These granulations are regarded by some as follicles, by others as true granulations. Granulations and follicles are, therefore, synonyms. These granulations may occur with an acute process—*acute granular conjunctivitis*. But it is very important to know that these granulations are also found for a long time unaccompanied with inflammation, or there is only slight injection of the conjunctiva. In such cases the disease is not suspected by a casual look at the eyes, it being manifest only when the lids are everted.

This granular conjunctivitis is generally accompanied with the so-called papillary form of the disease, which shows itself principally in the upper conjunctival *cul-de-sac*, as papillary excrescences dependent on proliferations of the papillæ of the conjunctiva. But this should not, I believe, be regarded as a special form of the disease, for in most of the cases of granular conjunctivitis this papillary form is present. Both forms are contagious, and one is no more so than the other.

Horner* believes that the essential points of difference between the granular and papillary forms is that the granular form is due to miasmatic infection (bad air), the papillary form being due to contagious infection through secretion from a diseased eye. But one or both forms may

* Fr. Horner, "Die Krankheiten des Auges im Kindesalter." Gerhardt's "Handbuch der Kinderkrankheiten," 1882, v, 2, p. 313.

certainly result from contact with the secretion of one or the other form of the disease. Both forms, then, I believe, are contagious, and both forms lead to the same cicatricial changes in the conjunctiva. Goldzieher* speaks of an epidemic in the Blind Asylum in Budapest which had been lighted up by a newly admitted boy who had lost his eyes by acute conjunctival blennorrhœa (gonorrhœal conjunctivitis). From this case several male, and the majority of the female, pupils were infected. All imaginable forms occurred, from pure blennorrhœa to pure granular trachoma, with all the intermediate stages. And von Arlt often observed that the one form gave rise to the other form in another individual, the correctness of which statement I can fully corroborate.

Von Arlt, who was the first to give a comprehensive description of the true granulations, formerly insisted on the separation of the two forms; now he considers them as the same disease. The prophylaxis is certainly the same in the two forms, and we should regard them as one and the same disease. We have seen that granular conjunctivitis may result from infection with the secretion from an eye with purulent conjunctivitis, and that the reverse may be the case; however, as a general thing, when an eye is infected with the secretion from acute blennorrhœa, it acquires the same disease. If the disease be trachoma, trachoma is the result of the infection. The more active the catarrhal process in granular conjunctivitis, and the fresher the secretion, the more active will be the contagium. The secretion has been observed to retain its power for about thirty-six hours when dried on linen (Peringer).

Sattler stated at the Ophthalmological Congress at Heidelberg, in 1881 and 1882, that there was in trachoma a micrococcus peculiar to the disease, which occurs in the

* "Heidelberger ophthal. Congress," 1881, p. 37.

secretion (of trachoma and blennorrhœa of new-born) as well as in the trachoma again, and in the tissue. The spores were described as being circular, united in threes or fours. Sattler professes to have succeeded in reproducing this disease by inoculation of a human eye with a culture of the coccus in question. I have been greatly interested in this matter, but I have not been able to confirm Sattler's view. Every form of coccus, as far as is demonstrable with our present means, was certainly absent from the large number of trachoma cases which I examined two years ago with this end in view; and the investigations which I have made more recently convince me that cocci are present in the conjunctival tissue only when the disease in question is accompanied by an active catarrhal process. Nor could Da Gama Pinto* demonstrate these micro-organisms in the tissue of trachoma, and Krause† failed in his attempts to cultivate them. But there can not be any doubt about the contagious nature of this disease, and the secretion is the carrier of the contagium; and, the closer the secretion approaches a purulent character, the more active will it be, and the quicker will it show its effects when brought in contact with healthy eyes. The way in which the disease is spread is through the secretion on the fingers, towels, etc. The possibility of the infection taking place through the air can not be denied; but this mode of transfer must be rare, for even where large numbers of people occupy the same room, as in barracks, schools, protectories, etc., many of whom have the disease in question, it is most probable that the transfer takes place indirectly through actual contact of person, or through towels, wash-water, etc.

Cohn‡ examined 111 children resident in an institution for deaf-mutes in Breslau, of whom 84 had trachoma;

* "Centralblatt f. Augenheilkunde," 1884.

† Ibid., 1882.

‡ "Hygiene des Auges in den Schulen," p. 170, 1867.

among the externes, on the other hand, there was not a single case of the disease. These figures are not large, but they show, by comparison, that the principal danger is not from children with trachoma being simply in the same room with healthy children, but, when they come to use the same towel and other washing utensils, the conditions are changed, and the spread of the disease is easy and rapid.

You know that for a long time the opinion prevailed that trachoma was first introduced into Europe by the soldiers of Napoleon I, who had acquired the disease in Egypt, hence the name *ophthalmia ægyptiaca*. However, there is good reason to believe that trachoma was known in Europe at a very early period in its history. But the terrible inroads trachoma made among the Napoleonic troops attracted general attention to it, and our more exact knowledge of trachoma certainly dates from the time of Napoleon I. We are told that 32,000 of Napoleon's soldiers were seized with trachoma; the English troops then in Egypt were also attacked with it; and in the succeeding twenty years the disease spread among nearly all European armies, and became epidemic (Larrey). The records of this epidemic are very extensive and extremely instructive. A few data deduced from these records will show the ravages the disease is capable of making: In the English army, in 1818, there were 5,000 invalids blind from this disease. In the Prussian army, 1813-1817, from 20,000 to 25,000 men were attacked with this disease, of whom 150 became totally blind, and 250 blind in one eye. In the Russian army, between 1816 and 1839, 76,811 men took the disease, of whom 654 became totally blind, and 878 blind in one eye only. In Italy, of 1,500 men with the disease, 97 lost one eye and 49 lost both eyes. In the Belgian army, in 1840, every fifth man had trachoma, and 4,000 men lost the sight of both eyes, and 10,000 men lost the sight of one eye (Jüngken). In 1848 the disease

reached Denmark, where, in Copenhagen alone, of 6,171 men, 1,156 took the disease (Fuchs). In recent years this disease has not appeared in epidemic form in the armies of Europe, but it still exists among the soldiers, numbers of whom leave the army with the disease uncured, emigrate to America, and thus become the means of spreading the disease in civil life. The statistics of Reich * are interesting in this connection. Among 40,000 soldiers (Caucasian army), 2,909 had granular ophthalmia, therefore 7·2 per cent.; and of 3,401 recruits, 3 per cent. had the disease, the inference being that the other 4·2 per cent. were infected in the army (Fuchs). In the navy the disease is no less terrible in its consequences. From the statistics of the sanitary records of the imperial navy we learn that in the Austrian navy, in 1875, almost every sixth man had trachoma. At St. Hubert, in Belgium, where trachoma is said to have been unknown before, it broke out in a severe epidemic in 1874, after soldiers with the disease had been quartered there, so that during the following year the disease had spread to such an extent that there were hardly any healthy eyelids to be found among the inhabitants, except among the children and aged (Dastot †).

But I do not marshal these figures before you because I believe that our army and navy are at present menaced with this terrible disorder; I think that they are pretty safe, especially on the score of numerical advantages, in this respect. For, our army being small, and the provisions for the soldiers' comfort being ample, they are in far less danger from the disease than are the large armies of Europe. I only adduce these figures to show to what extent the collecting together of large numbers of human beings under unfavorable hygienic surroundings contributes to the pro-

* Nagel's "Jahresbericht," 1878, No. 267.

† "De l'ophtalmie granuleuse dans les écoles," Mons, 1878.

duction and propagation of trachoma, and to give you some notion of the mischief it is capable of doing to sight. I am compelled to use the figures in the records furnished by our European colleagues, because in our country the disease in question has never existed as an extensive epidemic, nor has it received quite the attention which it deserves. The statistics, therefore, are wanting. But, if our army and navy are not threatened with this disease, we still are most alarmingly threatened with it in civil life, for a more humane civilization is multiplying new agents for spreading this and kindred contagious diseases—institutions where large numbers of human beings live together—*i. e.*, nurseries, asylums for children, almshouses, schools, prisons, workhouses, etc. The gentlemen of the committee appointed by the New York Academy of Medicine last year, in co-operation with the Board of Health, are engaged, with other experts, in personally inspecting our asylums and residential schools, etc., for the purpose of determining the extent of contagious eye diseases in these places. Last week the chairman of this committee, Dr. Derby, published in the New York "Medical Record" a preliminary report of the committee in question, which shows very plainly the necessity for taking radical steps to introduce a system in the management of these institutions which will go far toward preventing contagious eye disease from ever making any alarming inroads in our public institutions. This system is embodied in a bill which is now before the Legislature, and its recommendation by that body is a matter of the very greatest importance to our State.* I will not ask you to listen to a recital of the figures contained in Dr. Derby's preliminary report. They show, in the most convincing manner possible, that the eyes of the children in our public institutions are in a most deplorable condition. They

* This bill has become a law since the foregoing was written.

show that, in spite of the honest zeal of our protectory societies, a great reformation is needed in the management of the hygiene of the asylums and residential schools of New York city and vicinity, where large numbers of children are constantly losing their sight because of the ignorance which prevails as to the methods for preventing the spread of contagious eye disease, and that, in their benevolence, while they are furnishing homes for homeless and helpless children, they have overlooked the fact that these homes are, in point of personal and domestic hygiene, far from what they should be, and that, in many instances, while they provide a home for these little creatures, they take in exchange the sight of the recipient by means which very simple methods might have removed. A tacit consent to carry out suggestions for the proper management and application of settled rules of preventive medicine in dealing with contagious disease is not enough. There must be a law making it obligatory for every board of management of incorporated institutions in which large numbers of children are received or cared for, especially on the congregate plan, to follow and enforce the rules framed for their guidance, and the bill framed by the committee of the New York Academy of Medicine is calculated to meet this urgent demand.

It has been found in Europe that trachoma is very common in boarding-schools. In English schools Bowman found that 59 per cent., Nettleship found 50 per cent. to 60 per cent. of the inmates had trachoma.

In the workhouses in Dublin, according to Kirkpatrick, during five years, 134,838 individuals were attacked with this disease.

Mackenzie speaks of an outbreak of trachoma on the slave-ship *Rodem*, which had 22 sailors and 160 slaves on board. Under way trachoma broke out among the peo-

ple; only a single sailor escaped the disease. When the ship reached port, 39 negroes and 12 sailors had lost one eye.

Of 2,137 children examined by Dr. Mittendorf at the Catholic Protectory in this city, 871 children were found affected with this disease. In St. Patrick's Orphan Asylum, in this city, Dr. Agnew found 203 cases of communicable eye-disease (trachoma?) among 409 children. In St. Joseph's Asylum, in this city, Dr. Roosa found among 521 children 304 cases of communicable eye-disease. In the Hebrew Sheltering Guardian Society, in this city, I found 35 cases of communicable eye-disease (trachoma) among 52 children. In this institution the principal significant factor in the spread of the eye-disease is the use by children with healthy eyes of the same towel as has been used by other children with contagious eye disease. All of which goes to show that crowding together of many persons, and principally the general use of the same washing utensils—as towels, sponges, etc.—are the most active agents in spreading this disease.

The great ravages of trachoma in the armies of Europe and in the prisons and other public institutions in Europe, to which allusion has been made, were due to the disease having made its appearance in an acute form, beginning as it did with great swelling of the lids, profuse purulent secretion, the cornea being involved. In these days the disease is seen most commonly in the chronic form.

Ophthalmia of the New-born.—There can be no doubt that this eye-affection belongs in the line of gonorrhœic disease. The important question now is, How does the gonorrhœic poison reach the eye of the child? Most obstetricians and ophthalmologists appear to be of the opinion that the blennorrhœa occurs during the birth of the child by an abnormal vaginal secretion of the mother being conveyed to the conjunctiva of the child. But post-partum infection ap-

pears to be more frequent than infection at birth; and even when the mother is affected the disease does not generally occur in the child unless the labor be a protracted one. For instance, among 304 children with blennorrhœa, Credé found that in 50 per cent. the expulsion of the head was protracted. Piringer and Haussmann furnish similar statements.

Theremin gives a very interesting table touching the question of the relative frequency of infection at birth and at a period subsequent to it: Among 476 cases of blennorrhœa—1st to 4th day, 57 cases; 4th to 8th day, 134 cases; 8th to 14th day, 94 cases; later, 191 cases.

The disease is unquestionably more frequently communicated after birth, through the agency of the fingers of the nurse or mother, or in the first wash after birth when any infectious discharge which may adhere to the infant's body is mixed with the water of the bath and in washing the face, introduced between the lids; although I appreciate that the blennorrhœic secretion undoubtedly does lose its virulence when diluted to a certain point. Then the child may be infected by the mother through her fingers or cloths, which may be soiled with the discharge from her genitals.

Prophylaxis.—In a recently published paper on the treatment of purulent conjunctivitis* in the new-born, I adduced a large number of facts which showed the value of the prophylactic measure introduced by Credé of instilling a two-per-cent. solution of nitrate of silver into the eyes of the new-born immediately after birth. It was shown that Credé had first tried thorough cleansing of the diseased vagina of the mother before the birth of the child. The number of cases of eye trouble was diminished thereby, but it did not disappear. When he began to disinfect the eyes of the infants the results were more favorable. This was

* "N. Y. Medical Journal," October 24 and 31, 1885.

quite natural, because, if the child was infected at the time of its birth, no amount of attention bestowed upon the mother would affect the child so long as it was neglected.

Previous to the introduction of the instillations of a two-per-cent. solution of nitrate of silver in Credé's clinic at Leipsic, 10 per cent. of the children born there had eye-trouble; since their employment, the disease is practically banished.

The procedure adopted by Credé was as follows: All eyes, without exception, were, immediately after birth, first washed with plain water and disinfected with a solution of nitrate of silver (2 per cent.), a single drop being placed in each eye; then the eyes were cooled with pledgets of linen wet in a solution of salicylic acid (2 per cent.). The vaginal douche was, on the contrary, discontinued.

I have had three opportunities of making a very thorough test of the value of silver as a prophylactic against gonorrhœal conjunctivitis. In these cases the gonorrhœic matter was known to have entered the eye, and the time of its entrance noted. In one case the matter remained in the eye for forty minutes, in another for one hour, in another for fifty minutes. A two-per-cent. solution of silver was instilled into the eye at the end of the time noted in the cases mentioned; not a single drop, but several drops, were placed in the eye and pieces of linen wet in a saturated solution of boric acid were applied to the lids for sixteen consecutive hours. The disease did not develop in any of these cases. Now, it may be asked whether these same instillations will be attended by good result after the disease is developed. I say, Yes; but they must be repeated often. I think that the chief merit of the single instillation immediately after the birth of the child consists in the fact that these instillations destroy the virulence of the secretion transferred before it has imparted its poisonous qualities to the secretion

of the parts to which it has been conveyed, and I am confident that this is the great secret of our success with nitrate of silver, when it is used as a prophylactic, and in an early stage of gonorrhœal inflammation. I can not see any reason for making these instillations in the case of every child born in our public institutions unless the mother be the subject of an abnormal vaginal discharge; for I have satisfied myself that the normal lochial secretion does not contain infectious properties.

You know that it has been maintained that the normal lochial secretion was capable of setting up a conjunctival blennorrhœa. I do not believe this statement is in any way justified by facts.

You know that blindness from ophthalmia of the newborn occurs mainly among the ignorant poor. Ignorant of the dangerous character of a discharge of pus from an infant's eyes, these people often resort to some unsuitable domestic remedy, and delay seeking medical assistance until it is too late, even by the most skillful treatment, to save the child's sight. Our general dispensaries might aid very materially in disseminating intelligence touching the danger of neglecting to apply for medical advice when an infant has a discharge of pus from its eyes, by having conspicuously printed, on the card presented to every patient who applies for medical aid, the following *Instructions Regarding New-born Infants* :

"If the child's eyes become red and matter begins to run from them, at any time after birth, take the child at once to a doctor. The disease is very dangerous, and, if not treated at once, it may destroy the sight of both eyes."

An effort was made a short time ago in England, in these same words, to spread this valuable intelligence through the "Poor Law Act," but it failed. Roth, in London, circulated tracts, through the *Society for the Prevention of Blindness*,

which treated of *blennorrhœa* in infants. Brière, in Havre, caused a popular form of instructions for the care of ophthalmia in the new-born to be presented to every person who registered the birth of a child. In consequence of these and numerous other efforts, with the same end in view, some European governments have begun to give the subject serious attention.

In this great city, so rife with persons who make charitable work the especial object of their zeal, such persons could do a great deal toward introducing a wise and generous economy in our public charities and aid in spreading this important warning among the poor. But it is very evident that our practical philanthropists must first make themselves broader students of the matters which they undertake to regulate. They will then see that the reduction of expenses in our public charities, while of great importance in itself, should not be the sole object of their zeal; for that certainly is a false and ungenerous economy which reduces the expenses of our public institutions, and mainly thereby entails upon the recipients of its would-be benevolence sufferings and misery, which a special and expensive asylum (for the blind) must be provided to support.

When that law shall have been enacted which will make it a misdemeanor on the part of the managers of our schools and reformatories not to conform to the letter of a law which states in terms what cubic air-space must be secured for each inmate; what the dietary must be; especial weight being laid on the injunction that the inmates wash either in running water, or that every one have and use his own wash-basin and towel; that the eyes of every applicant for admission to these institutions be subjected to inspection by a competent medical man; and, if it is not consistent with the aims of the institution to receive trachomatous or other contagious eye-diseases, to reject them; but, if re-

ceived, that such persons be separated from those inmates who have healthy eyes; and, furthermore, that at least monthly medical inspections be held—I fully realize the difficulties which may often attend the separation of trachomatous patients from those inmates of a school or reformatory, etc., who have healthy eyes. You know that in Mons, Belgium, there is a special infirmary for trachomatous children where they are housed, instructed, and receive medical treatment. I firmly believe that the establishment of such an institution in the vicinity of this city would be capable of accomplishing a great deal of good.

Those of us who have recently been engaged in inspecting the schools and asylums in this city have developed the fact that one out of every four of the inmates had contagious eye-diseases, and that the managers of said institutions were ignorant of the fact that there was a single case of such a disease among their charges. Of course, under such circumstances, the healthy and the diseased mingle together, and the evil consequences are self-evident.

But I do believe that we are capable of preventing the spread of this disease in large institutions which are under the surveillance of a competent medical man, provided we recognize all the cases of the disease in such an institution, and promptly place those cases with much secretion, or an active catarrhal process, in the hospital, and not allow them to mingle with the healthy children under any circumstances; those, on the other hand, in whom there is very slight or no secretion, being allowed to go to school and work together by day, but be separated at night; for trachomatous persons should *not* be allowed to sleep in the same room with persons who are healthy.

Then no trachomatous patient should be apprenticed out or released from our public institutions until the disease

is cured, because such patients would endanger the other inmates of their homes.

Until such a law shall have been enacted, we shall struggle hopelessly against the spread of this terrible disease in our public institutions, many of which, because of the overcrowding, insufficient food, and general insanitation which prevails in them, are recognized active agents in recruiting the ranks of helpless human beings by impairing their usefulness and lowering their industrial capacity by permitting those preventable diseases to go on multiplying which to such an alarming extent lead to total blindness.

Treatment.—Practically, purulent diphtheritic croupous and trachomatous conjunctivitis are transmitted chiefly by inoculation.

I am convinced that almost all eyes may be saved from loss by purulent conjunctivitis by timely resort to the treatment which I shall point out. During the past three years there has been much discussion regarding the best methods to employ in the treatment of this disease. Some writers have maintained that they could, with cold and frequent washing of the eye, accomplish all that has been asserted for so-called antiseptics or germicides. Solutions of quinine, carbolic acid, boric acid, corrosive sublimate, nitrate of silver, and iodoform in powder, have received their share of praise by different observers, based on the supposed antiseptic or germicidal properties of the favored drug. The great mistake that some of these observers have made was in maintaining that with the employment of their favorite germicide they could dispense with the day and night nurse, and the scrupulous cleanliness which this implies. I believe that it can no longer be disputed that gonorrhœal conjunctivitis without the presence of a micro-organism peculiar to itself is not possible; and, further, that this particular coccus

is the real exciting agent in the infection; for gonorrhœal inflammation has certainly been artificially produced in the human subject with a pure culture of the gonococcus. In view of these facts, and the indisputable evidence which clinical experience furnishes of the marked beneficial effect on gonorrhœic inflammation produced by the use of nitrate of silver, I am disposed to ascribe to this remedy qualities which are not possessed by another drug employed in the treatment of this disease.

You know that Oppenheimer, of Heidelberg, has published the results of some interesting experiments with bismuth, boric acid, carbolic acid, corrosive sublimate, and nitrate of silver, which show that corrosive sublimate and nitrate of silver are the two agents which are most speedily destructive to the gonococcus. These experiments I have verified in so far as the corrosive sublimate and silver are concerned. Now, we are perfectly aware that the actual cautery is sure death to all germs with which it is brought in contact; also that certain chemical agents are capable of doing the same, but only in such strength as to be, like the hot iron, destructive to the tissues. Oppenheimer found that a two-per-cent. solution of nitrate of silver was capable of arresting the development of the gonococcus. Oppenheimer's experiments consisted in cultivating the gonococcus in blood-serum. He found that of the mercurials, the bichloride was capable, in a weaker solution than the other salts of mercury, of affecting the growth of this germ. A solution of corrosive sublimate, 1 to 40,000, retarded development, and one of 1 to 20,000 destroyed the vitality of the gonococcus. My own experiments with silver and mercurial salts, with the same end in view, were made to determine how soon these agents were capable of destroying the infectious properties of gonorrhœic pus itself; that is to say, of destroying the gonococcus in the presence of its fa-

vorite medium, pus; and I found that a two-per-cent. solution of nitrate of silver was capable of doing this in from six to eight minutes. Another important virtue of the silver is that it gives rise to a superficial eschar, carrying off epithelial cells among which gonococci are entangled. But, Mr. President, the nitrate of silver is not sufficient. Cold applications to the lids and frequent washing are just as indispensable as heretofore. The use of nitrate of silver in this disease is not new. One of the most valuable papers ever published on the use of nitrate of silver in purulent conjunctivitis was written by von Graefe thirty years ago; and it has lost little of its value by the time which has passed over it. However, I believe that the silver (mitigated stick), as recommended by von Graefe in the treatment of purulent conjunctivitis, should no longer be used. I am convinced that the weaker solutions are efficient, and the only novelty in the use of nitrate of silver, as I employ it, is that the instillations are frequently repeated.

So long as the redness, heat, and swelling are on the increase, iced cloths should be applied to the lids, without interruption, day and night. Every fifteen minutes the lids should be gently separated and the secretion carefully washed out with bits of absorbent cotton dipped in a saturated solution of boric acid. I fully appreciate the value of an abundance of water in making all contagia more or less inactive. But the difficulty in the case of the eye has been to employ irrigation with effectiveness. I have devised for this purpose an eyelid retractor,* the arms of which are hollow, with a number of perforations in the jaw for the passage of the fluid, which is supplied by a fountain-syringe. The lids should be gently lifted from the eyeball by means of the retractor, and the spray of

* See this Journal, October 31, 1885, p. 483.

fluid allowed to play upon the upper *cul-de-sac* for a few minutes, the length of time to be regulated by the amount of the discharge.

I employ a two-per-cent. solution of nitrate of silver from the very beginning of the disease, for I am convinced that it is capable of doing the most good in the early stage of the disease. By *dropping* the solution into the eye, the movements of the lids distribute it better than would be the case when the solution was brushed over the conjunctiva. The frequency of the application should be regulated by the character of the conjunctiva; the more vascular and succulent the conjunctiva, the more frequently should the two-per-cent. solution of silver be employed. When the vascularity and succulence of the conjunctiva are very pronounced, a twelve-per-cent. solution may be brushed over the conjunctiva of the everted lids. If the conjunctiva of the globe is only slightly affected, this stronger solution had better be washed off before the lids are replaced; if, however, this part is much involved, the lids may be replaced and the eye washed out, after about one minute, with cold water, and the cold compress be applied at once. As soon as the swelling decreases, the cold applications may be limited to two hours morning, noon, and evening. This treatment is certainly very simple, but it implies great and incessant care, and two skilled and trusty nurses—one for the day, the other for the night—who shall be in constant attendance. I know how terrible the results sometimes are in gonorrhœic ophthalmia in children and adults, but in my experience these frequent instillations of silver, together with the other vigorous and persistent important adjuncts just detailed, save the majority of cases.

I will not ask you to listen to the histories of sixteen cases of gonorrhœic conjunctivitis which I have recently treated by the employment of repeated instillations of a

two-per-cent. solution of nitrate of silver. I will only say that the eye was not seriously damaged in a single instance. A striking illustration of the value of these frequently repeated instillations of silver was a case of gonorrhœic conjunctivitis which occurred recently in my service at Charity Hospital. The patient had but one eye. A one-per-cent. solution of nitrate of silver had been used in frequent instillations for nearly two days, the disease growing worse under this treatment. The cornea was involved, and the chemosis intense, but the improvement was very striking in thirty-four hours after the instillations of a two-per-cent. solution of nitrate of silver had been begun, and the patient recovered without damage to his sight.

Mr. President, there is certainly no question in ophthalmology so important as the treatment of purulent conjunctivitis, and, if I have taxed your patience and trespassed on your indulgence, I can only plead in extenuation my desire to record some personal experience with a familiar disease and an equally familiar remedial agent.

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